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LonBuilder
Processor Boards Summary

Model 25000—LonBuilder Neuron Emulator
Model 25200—LonBuilder Single Board Computer (SBC)
Model 25400—LonBuilder Router

LonBuilder Processor Boards Summary

The LonBuilder™ processor boards provide LonWorks™ nodes for use during development.

The three LonBuilder processor boards:

▼ *Neuron Emulator* The starting point for Neuron® Chip application development. Works with the Neuron C Debugger to provide a comprehensive debugging and prototyping environment.

▼ *SBC* A prototype LonWorks node for testing in a distributed environment.

▼ *Router* Connects two LonWorks communication channels.

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LONBUILDER
NEURON EMULATOR

**LONBUILDER
NEURON EMULATOR**

The LONBUILDER™ NEURON® Emulator is the primary tool used to develop LONWORKS™ nodes. It works closely with the NEURON C Debugger, incorporating a NEURON 3150™ with 64 KB of RAM to support source-level software debugging and hardware prototyping. The NEURON Emulator allows developers to execute software independent of target hardware, so software can be developed before hardware is even available. The NEURON Emulator also provides full hardware support for fast application downloading, source-level breakpoints, single-stepping, reset/start/stop, and memory read/write protection. Each emulator board can accommodate up to two expansion boards for testing with prototype I/O and transceiver hardware.

FEATURES AND BENEFITS

▼ *Configurable clock rate*

Emulate any of the NEURON CHIP clock rates for accurate performance testing

▼ *64 KB of dual-ported RAM for code and data*

Execute any application with no performance degradation

▼ *Hardware breakpoints by byte for up to 64 KB*

The NEURON C Debugger can set a break-point on any statement without modifying application code

▼ *Read/write protect by byte for up to 64 KB*

Emulate any NEURON 3150 or NEURON 3120™ memory map

▼ *Backplane transceiver*

Inexpensive networking between processor boards installed in a development station

▼ *Accepts an optional transceiver expansion board*

Simplified connection to other media using LONBUILDER transceivers, and rapid prototyping of custom transceivers

▼ *Accepts an optional I/O expansion board*

Faster testing of custom I/O interfaces using the LONBUILDER I/O Evaluation Board, or using custom I/O expansion boards

CONFIGURATION

The emulator must be installed in a development station, and reside on the same network as the LONBUILDER network management node. The emulator can be used with the development station backplane network for implementing a network consisting only of the boards installed within the development station. An optional transceiver must be added to each emulator for interfacing with other media and for interfacing with nodes outside the development station.

The emulator requires both the Development Station Software and the NEURON C Developer's Kit.

Technical Specifications

Temperature Operating Non-operating	0 to 40°C -20 to 65°C
Operating Voltage	+5V @ 1.0A, plus expansion power (powered from development station)
Expansion Power (power supplied by the development station for use by expansion boards)	+5V @ 400mA per expansion board +/-12V @ 35mA per expansion board
Dimensions	168 mm x 267 mm x 19 mm (6.6" x 10.5" x 0.75")
Processor	NEURON 3150 CHIP
NEURON CHIP Input Clock Rate	10 MHz, 5 MHz, 2.5 MHz, 1.25 MHz, or 625 KHz (software configurable)
Network Interface	LONBUILDER transceiver expansion board. Backplane transceiver included; other transceivers optional
I/O Interface	IO.0 Display LED, IO.4 input button (jumper selectable), and optional I/O expansion board
Service Interface	Service button and service LED
Memory	64 KB Code/Data dual-ported RAM 64 KB Control RAM

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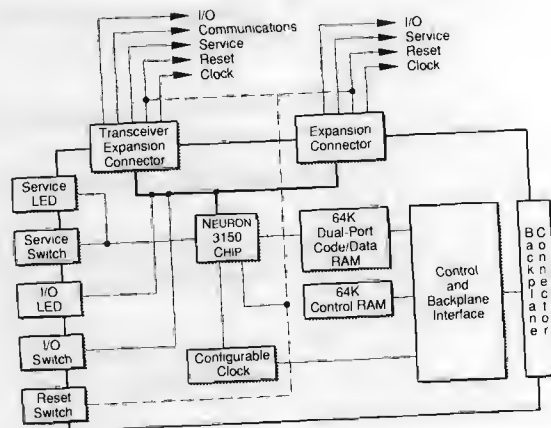
LONBUILDER
SINGLE BOARD COMPUTER (SBC)

**LONBUILDER
SINGLE BOARD COMPUTER (SEC)**
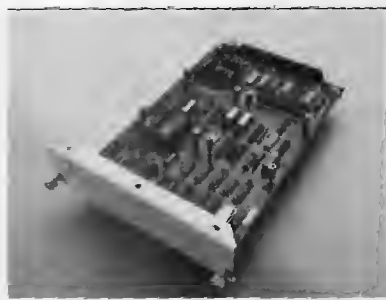
The LONBUILDER™ Single Board Computer (SBC) is a complete LONWORKS™ node used to create a realistic network environment for application software after it has been debugged on a NEURON® Emulator. The SBC can be used one of two ways: locally within a development station, or remote with a user-supplied 5V power supply. This allows developers to extend prototype networks beyond the development station. The SBC features a NEURON 3150™ CHIP with 64 KB of non-volatile RAM. It includes a backplane transceiver, which connects the board to the backplane network of the development station. The SBC accepts the same expansion boards as the emulator, so prototype I/O and transceiver boards may also be tested in a remote SBC.

FEATURES AND BENEFITS

▼ *Remote operation* — Create true distributed networks with minimal hardware development

▼ *Configurable clock rate* — Emulate any of the NEURON CHIP clock rates for accurate performance testing

▼ *64 KB of RAM for code and data* — Execute any application with no performance degradation and download new application code over the network

▼ *Non-volatile RAM* — Retains application and network image when power is cycled

▼ *Backplane transceiver* — Inexpensive networking between processor boards installed in a development station

▼ *Accepts an optional transceiver expansion board* — Simplified connection to other media using LONBUILDER transceivers and rapid prototyping of custom transceivers

▼ *Accepts an optional I/O expansion board* — Faster testing of custom I/O interfaces using the LONBUILDER I/O Evaluation Board or using custom I/O expansion boards

▼ *Optional remote node enclosure available* — Provides shielding and physical protection when used remote from a development station; required for use with an optional LONBUILDER RF transceiver

CONFIGURATION

The SBC can be used with the development station backplane network for implementing a network consisting only of the boards installed within the development station. Optional transceivers must be added for each SBC for interfacing with other media and for interfacing with nodes outside the development station. Optional transceivers and +5V power must be added for each SBC located remote from a development station.

Development station hardware and software are required to load and configure an SBC.

TECHNICAL SPECIFICATIONS

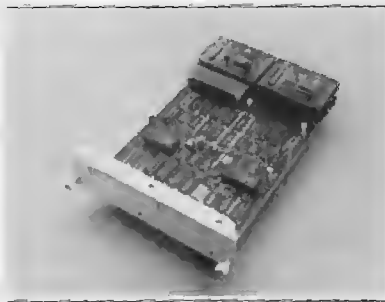|	
Temperature 　Operating 　Non-operating	0 to 40°C -20 to 65°C
Operating Voltage	+5V +/- 5% @ 1.0 A, plus expansion power (powered from development station or external power source)
Expansion Power (power supplied by the development station for use by expansion boards)	+5V @ 400mA per expansion board +/-12V @ 35mA per expansion board
Dimensions	168 mm x 267 mm x 19 mm (6.6″ x 10.5″ x 0.75″)
Processor	NEURON 3150 CHIP
NEURON CHIP Input Clock Rate	10 MHz, 5 MHz, 2.5 MHz, 1.25 MHz, or 625 KHz (software and hardware configurable)
Network Interface	LONBUILDER transceiver expansion board. Backplane transceiver included; other transceivers optional
I/O Interface	IO.0 Display LED, IO.4 input button (jumper selectable), and optional I/O expansion board
Service Interface	Service button and service LED

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LONBUILDER
ROUTER

LONBUILDER ROUTER

The LONBUILDER™ Router supports the development of networks with multiple communications channels and media. It incorporates two NEURON® 3150™ CHIPS and supports two transceiver expansion boards to provide routing between two communication channels. The router can be used one of two ways: locally within a development station, or remotely with two transceivers and user-supplied 5V power. The router can be configured for three modes of operation: *a learning router, configurable router,* or as a *bridge.* When configured as a learning router, the router learns the topology of the network and selectively forwards packets based on observing the network traffic. When configured as a configurable router, routing tables configured using the LONTALK™ network management services determine the routing behavior. When configured as a bridge, all packets are forwarded between the two channels. All routing decisions are based on the source and destination subnet addresses of packets.

FEATURES AND BENEFITS

▼ *Route between any pair of channels and media using 2 communication transceiver expansion boards*

Supports multi-media networks, including combinations of RF, twisted pair, powerline, and custom media; also provides segmentation of networks for improved performance

▼ *Configurable clock rate (10 MHz and 5 MHz)*

Emulate any of the NEURON CHIP bit rates for accurate performance testing

▼ *Priority handling of priority packets*

Faster response time for priority messages

▼ *32 KB of RAM per channel*

Provides buffering between two channels running at different bit rates

▼ *Backplane transceiver*

Inexpensive routing between processor boards installed in a development station and other media with one additional transceiver

▼ *Accepts 2 optional transceiver expansion boards*

Simplified connection to multiple media using LONBUILDER transceivers

▼ *Remote operation*

Create true distributed networks with minimal hardware development

▼ *Optional remote node enclosure available*

Provides shielding and physical protection when used remotely from a development station. Required for use with the optional LONBUILDER RF Transceiver
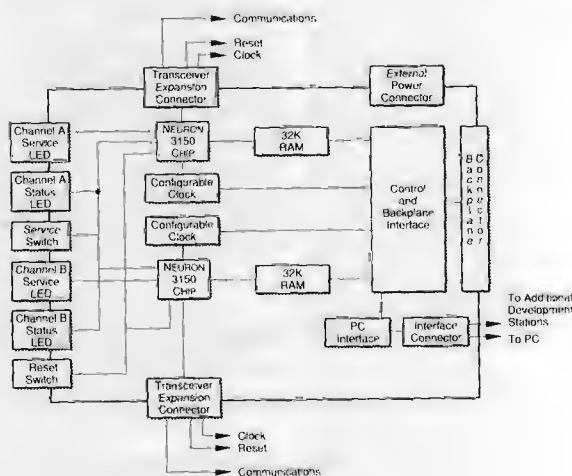
CONFIGURATION

The router can be used with the development station backplane network to route between the backplane network and external communication channels. When routing between the backplane and another channel, a single optional transceiver must be added for the second channel. The router may also be used for routing between two external channels, which requires two optional transceivers. The router may be used external to the development station, in which case two optional transceivers and external +5V power must be added.

Development station hardware and software are required to load and configure a router.

TECHNICAL SPECIFICATIONS

Temperature	
Operating	0 to 40°C
Non-operating	-20 to 65°C
Operating Voltage	+5V +/- 5% @ 1.0A, plus expansion power (powered from development station or external power source)
Expansion Power (power supplied by the development station for use by expansion boards)	+5V @ 400mA per expansion board +/-12V @ 35mA per expansion board
Dimensions	168 mm x 267 mm x 19 mm (6.6" x 10.5" x 0.75")
Processors	2 NEURON 3150 CHIPS (one per channel)
NEURON CHIP Input Clock Rate	10 MHz or 5 MHz (software and hardware configurable)
Network Interfaces	LONBUILDER transceiver expansion board for each channel. One backplane transceiver included; other transceivers optional
Service Interface	Service LED for each NEURON 3150 CHIP and service button
Status Display	Network traffic indicator LED for each channel
Memory	32 KB non-volatile RAM per NEURON 3150 CHIP

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